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(54) Lawn servicing machine

(57) The lawn servicing machine 1 has a rotatable lawn aerator 4, a rotatable lawn rake 5, a rotatable lawn brush 6 and a rotatable lawn spreader 7. These are mounted on a wheeled chassis 2. A rotary power source is also mounted on the chassis. The power source drives the aerator, rake and brush. The spreader has a rotor 89, attached to the rear axle, this being driven by the rear wheels 12.

The aerator and rake are housed within a safety cowl 21. The safety cowl tilts forward to bring the aerator blades 34 into contact with the lawn and tilts rearwards to bring the rake tines 35 into contact with the lawn.

The rotatable brush 6 has a deflector plate 79 fitted over it. This deflects material rearwards into a collector bag 95 or downwards onto the lawn.

FIG. 1A.

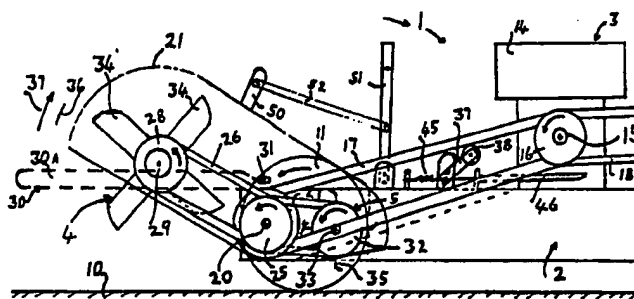
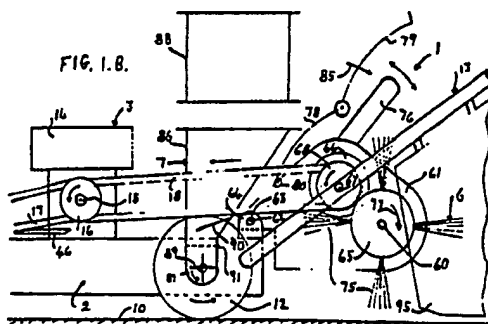


FIG. 1B.



At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

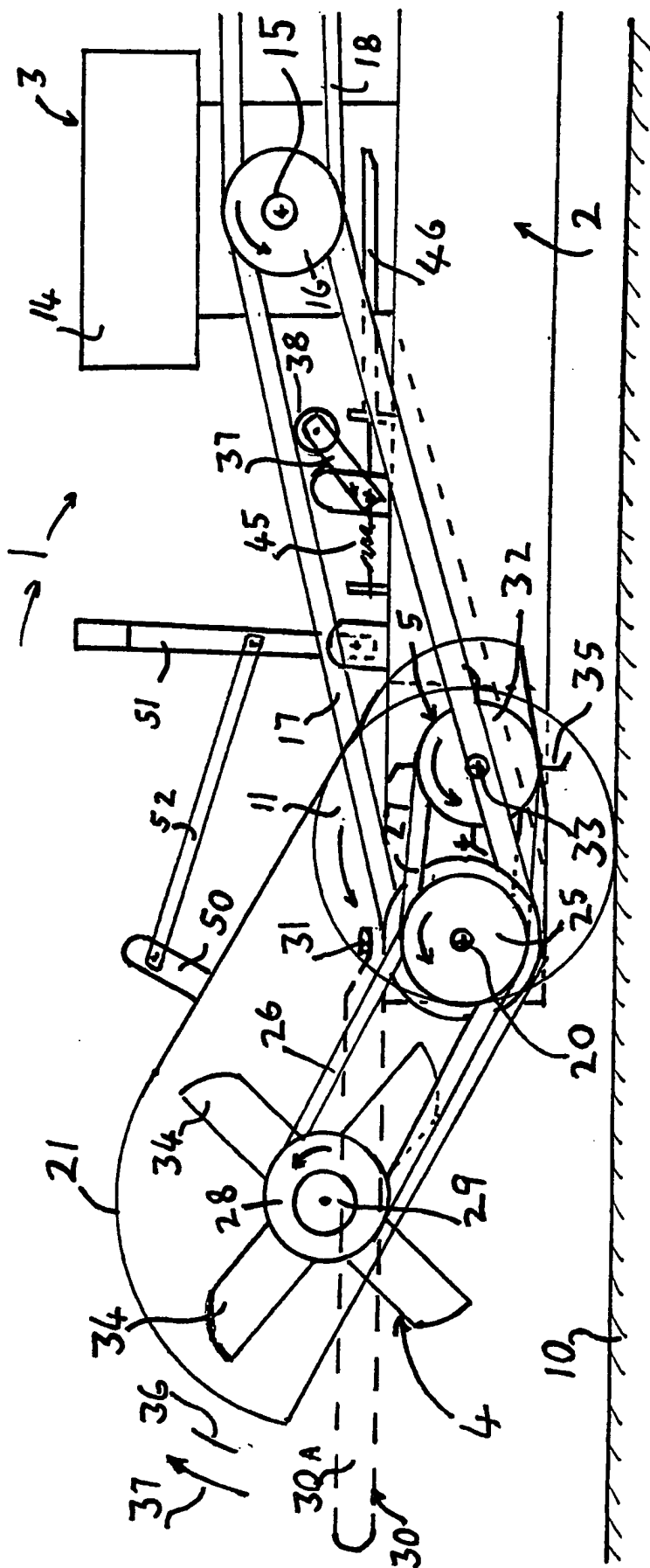
The claims were filed later than the filing date within the period prescribed by Rule 25(1) of the Patents Rules 1990.

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FIG. 1A.



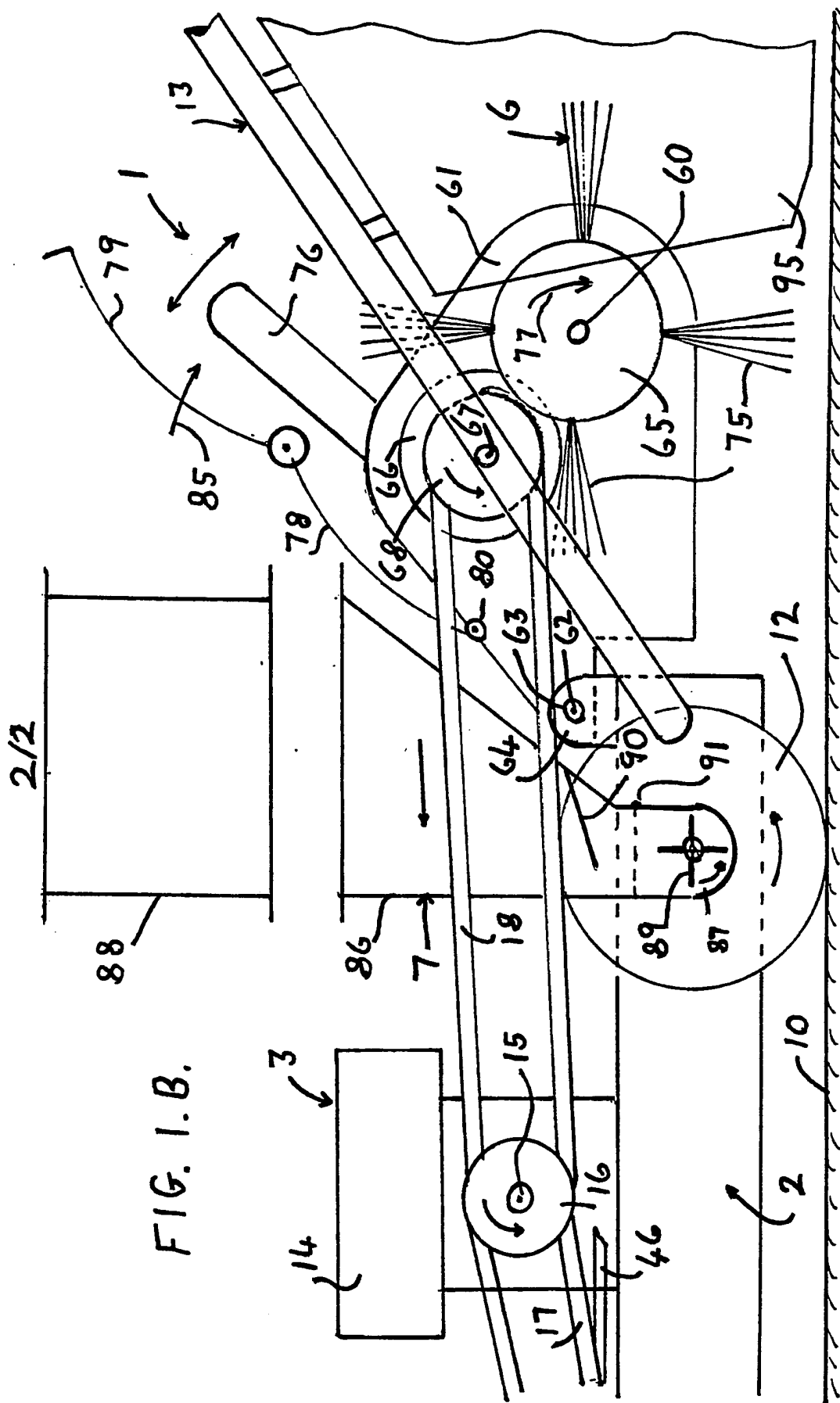


FIG. 1.B.

"IMPROVEMENTS IN OR RELATING TO
LAWN SERVICING MACHINES"

This invention relates to lawn servicing machines and provides a machine capable of performing several functions.

5 According to the invention, a lawn servicing machine comprises :-

- (a) a wheel-supported chassis,
- (b) a rotary power source mounted on the chassis,
- (c) rotatable lawn aerator means,
- 10 (d) rotatable lawn rake means,
- (e) rotatable brush means,
- each mounted on the chassis and each rotatable by said power source, and
- (f) means for applying dressing or other material to the
- 15 lawn, also mounted on the chassis.

The lawn aerator means may comprise rotatable cutter blades operable to form slots in the surface of the lawn.

20 Either the lawn aerator means or the lawn rake means may be driven by one power source transmission system, and the rotatable brush means may be driven by another power source transmission system.

25 The machine may be push-operated.

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An embodiment of the invention will now be described by way of example only, with reference to the accompanying drawings, wherein :-

5 Figures 1A and 1B combine to provide a side view, partly in section, of a lawn servicing machine.

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With reference to Figures 1A and 1B, a lawn servicing machine 1 comprises :-

- (a) a wheel-supported chassis 2,
- 20 (b) a rotary power source 3 mounted on the chassis 2,
- (c) rotatable lawn aerator means 4,
- (d) rotatable lawn rake means 5,
- (e) rotatable lawn brush means 6,
- each mounted on the chassis 2 and each rotatable by the
- 25 power source 3, and
- (f) means 7 for applying dressing or other material to the lawn, also mounted on the chassis 2.

30 The chassis 2 is of box-like form, having an open bottom and is supported above the surface of the lawn 10 by front and rear pairs of wheels 11, 12. The machine 1 is pushed over the lawn surface by a handle 13 mounted at the rear end of the chassis 2.

35 The power source 3 comprises a variable speed petrol engine 14 with an output drive shaft 15 on which a pair

of grooved pulleys 16 are mounted in tandem. (One pulley 16 is masked by the other). The pulleys 16 drive endless belts 17, 18.

- 5 The belt 17 engages with a grooved pulley 19 mounted on a shaft 20. A pair of grooved pulleys 25 are also mounted, in tandem, on the shaft 20. (One pulley 25 is masked by the other). The pulleys 25 drive endless belts 26, 27.

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- The belt 26 engages with a grooved pulley 28 mounted on a shaft 29. The ends of the shaft 29 are supported by a safety cowl 21 which is pivotable about the axis of the shaft 20. The cowl 21 is disposed within a
15 safety bumper 30 of substantially "U"-shaped form, when viewed in plan. The side limbs 30a of the bumper 30 are removably secured to the front end of the chassis 2 by bolts 31.

- 20 The belt 27 engages with a grooved pulley 32 mounted on a shaft 33. The ends of the shafts 20, 33 are supported by the chassis 2. Shafts 15, 10, 29 and 33 are all disposed substantially parallel to each other.

- 25 The aerator means 4 comprise the shaft 29 and six blades 34 extending radially therefrom, the blades being disposed in oppositely extending pairs, laterally spaced from each other. The blades 34 are shielded by the safety cowl 21, which can pivot, with the blades, within the bumper 30.

30

The rake means 5 comprise laterally-spaced, radially; extending tines 35 mounted on the shaft 33.

- The ends of the shaft 33 are also supported by the
35 safety cowl 21, so that if the cowl 21 is pivoted

in the direction of arrow 36 the blades 34 are brought into contact with the lawn 10. On the other hand, if the cowl 21 is pivoted in the direction of arrow 37, the tines 35 are brought into contact with the lawn 10.

The endless belt 17 is maintained in a slightly slack condition, so that, with the cowl 21 in the position illustrated, driving forces are not transmitted to the pulley 19.

A grooved pulley 38, operable by a pivotally mounted lever 39, is used to apply tension to the belt 17, when needed. The lever 39, which is pivotable about an axis 40, is biased towards an inoperative position by a tension spring 45. A Bowden cable 46 is used to overcome the spring 45 and bring the pulley 38 into a position whereby it causes tension to be applied to the belt 17. The pulley 38 is mounted on a support 47.

A cowl actuating lever 50 is mounted on the cowl 21. The lever 50 is pivotally connected to an operating lever 51, by way of a pin-jointed link 52. The bottom end of the lever 51 is pivotally connected to a fixed support 53. Forward or rearward movement of the lever 51 causes either the blades 34 of the aerator means 4, or, alternatively, the tines 35 of the rake means 5, to be brought into contact with the lawn 10.

The brush means 6 comprise a laterally extending shaft 60, the ends of which are supported by plates 61 pivotally mounted on the rear end of the chassis 2, so as to be rotatable about the common axis 62 of fulcrum pins 63 located in brackets 64.

A gear wheel 65 is mounted on the shaft 60 so as to

rotate therewith. The teeth of the gear wheel 65 engage with the teeth of a gear wheel 66 mounted on a shaft 67 so as to rotate therewith. A grooved pulley 68 is also mounted on the shaft 67, so as to rotate with it. The pulley 68 is driven by the endless belt 18.

The brush means 6 further comprise four laterally-extending, equi-spaced rows of brush members 75 which project radially from the shaft 60.

The plates 61 can be pivoted about the axis 62, by a lever 76 secured to one of the plates, whereby the brush means 6 is brought into contact with the lawn 10. At the same time the belt 18, (which is normally slightly slack), is tensioned, so that the brush means shaft 60 is rotated. The presence of the cooperating gear wheels 65, 65, cause the shaft 60 to be rotated in the direction of arrow 77. The lever 76 can also be used to take the brush means 6 out of operation when brushing is not required.

It will be appreciated that either the lawn aerator means 4 or the lawn rake means 5 may be driven by one power source transmission system, namely belt 17 and associated pulleys. It will also be appreciated that the rotatable brush means 6 may be driven by another power source transmission system, namely belt 17 and associated pulleys and gear wheels.

A pair of hingedly connected deflectors 78, 79 are mounted between the plates 61. Deflector 78 is fixed to the plates 61 at 80. Deflector 79 is movable relative to deflector 78, as indicated by arrow 85.

The dressing etc. means 7 comprise a hopper 86, the bottom end 87 of which is open to the lawn 10. A

hopper extension 88 may be used if required. A rotor 89 of cruciform cross-section is disposed in the bottom end 87, which end extends laterally, across substantially the full width of the chassis 2. The rotor 89 is mounted on the axle of the rear wheels 12, so that the rotor rotates together with the wheels. A deflector plate 90 is disposed in the hopper 87, above the rotor 89. The shafts 60, 67 and rotor 89 are all disposed substantially parallel to each other, and to shafts 15, 10, 29 and 33.

The bottom end 87 is connected by a hinge 91 to the remainder of the hopper 86, for hopper and rotor cleaning purposes.

Means, not shown, may be provided whereby material leaving the hopper 86 is spread substantially evenly. The means may comprise a pair of cooperating plates defining apertures, one plate fixed and the other movable relative to the fixed plate, so that the apertures of the two plates may be partially or wholly aligned with each other. The arrangement controls the discharge of material from the hopper outlet 87. Vibration imparted to the hopper 86 by the engine 14 will also assist the discharge of material, and prevent clogging of the plate apertures. Material loaded into the hopper 86 so as to spread on the lawn 10 may comprise weed killer, lawn dressing, lawn seed etc.

A bag 95 is demountably carried by the machine 1, being attached to the rear end of the chassis 2. The bag 95 is used to collect leaves, debris, thatch etc. picked up and then discharged rearwardly by the brush means 6.

In one mode of operation, the machine 1 is pushed over the surface of the lawn 10, whilst the aerator means 4, the spreader means 7 and the brush means 6 are employed. The

rotating blades of the aerator means 4 cut aerating slots in the lawn 10. This action is followed up immediately by application of, for example, lawn fertilizer material, distributed by the means 7, which then enters the slots.

The brush means 6 is used to brush in the material applied by the means 7. With the bag 95 removed, and the deflector 79 lowered, the brush means 6 is caused to brush-in the material applied, immediately after its application to the lawn 10.

Use of the machine 1 to cut the slots offers advantages over manual forms of aerating, using, for example, devices employing lawn penetrating tines. Follow-up with fertilizer material etc. often results in the holes in the lawn being clogged by the footwear of the person spreading the material.

In another mode of operation, the rake means 5 and brush means 6 are used together. The deflector 79 is first raised and the bag 95 fitted in position.

The machine 1 is then operated so that the rake means 5 is employed to scarify the surface of the lawn 10. This action is followed up by use of the brush means 6 whereby loose debris is picked up and discharged into the bag 95.

Various modifications are possible. For example, the knife-like blades 34 could be replaced by blades of circular or part-circular form, which may have serrated edges.

The push-operated machine 1 could be replaced by a machine which is self-propelled.

Hydraulic drives could replace the endless belt drives 17, 18.

5 The petrol engine 14 could be replaced by a different form of power source. For example, an electric motor, which may draw current from a rechargeable battery or from a mains supply.

CLAIMS

1 This invention relates to lawn servicing machines and provides a machine capable of performing several functions.

According to the invention, a lawn servicing machine comprises :-

- (a) a wheel-supported chassis,
 - (b) a rotary power source mounted on the chassis,
 - (c) rotatable lawn aerator means,
 - (d) rotatable lawn rake means,
 - (e) rotatable brush means,
- each mounted on the chassis and each rotatable by said power source,
- (f) means for applying dressing or other material to the lawn, also mounted on the chassis.

Either the lawn aerator means or the lawn rake means may be driven by one power source transmission system, and the rotatable brush means may be driven by another power source transmission system.

The lawn aerator means may comprise rotatable cutter blades operable to form slots in the surface of the lawn.

The lawn rake means may comprise of rotatable tines to scarify the lawn.

CLAIMS

The lawn brush means may comprise of rotatable sets of bristles to brush up thatch, leaves or grass cuttings and brush in top dressings and other material.

The lawn spreader means may comprise a rotor, driven by the rear wheels via the rear axle. The spreader means applies dressings or other material to the lawn.

The machine may be push operated.

2 A push operated lawn servicing machine as claimed in Claim 1, could be replaced by a machine which is self-propelled.

3 A lawn servicing machine substantially as described herein with reference to Figures 1a and 1b of the accompanying drawings.

Relevant Technical fields

(i) UK Cl (Edition L) A1B (BA5 BAB BAA BAX BS)
(ii) Int Cl (Edition 5) A01B 45/00 45/02 49/00 49/02
49/04 49/06

Search Examiner

K J KENNETT

Date of Search

21 JULY 1993

Databases (see over)

(i) UK Patent Office

(ii)

Documents considered relevant following a search in respect of claims 1-3

Category (see over)	Identity of document and relevant passages	Relevant to claim(s)
	NONE	

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&: Member of the same patent family, corresponding document.

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